



(51) International Patent Classification:

B01J 8/02 (2006.01) *C10J 3/72* (2006.01)
C10J 3/02 (2006.01) *C10J 3/34* (2006.01)
C10J 3/18 (2006.01) *C04B 28/04* (2006.01)
C10J 3/20 (2006.01) *C04B 35/52* (2006.01)

(21) International Application Number:

PCT/US2012/020361

(22) International Filing Date:

5 January 2012 (05.01.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

13/199,814 9 September 2011 (09.09.2011) US

(71) Applicant (for all designated States except US): **ALTER NRG CORP.** [CA/CA]; Suite 700, 910 7th Avenue SW, Calgary, Alberta T2P 3N8 (CA).

(72) Inventors; and

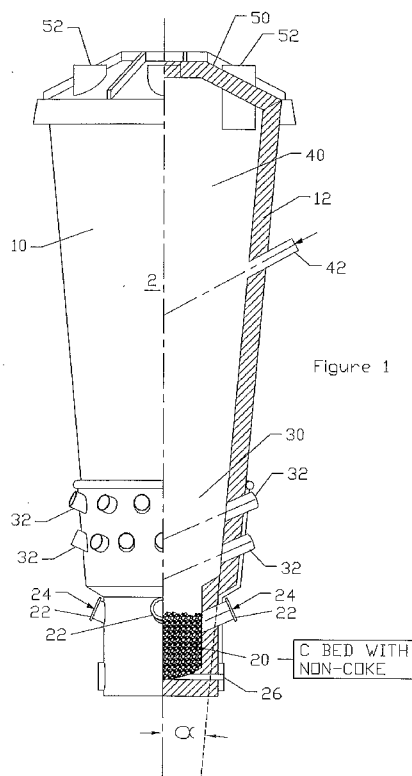
(75) Inventors/Applicants (for US only): **SANTOIANNI, James** [US/US]; 404 North Maple Avenue, Greensburg, Pennsylvania 15601 (US). **VAN NIEROP, Pieter** [CA/CA]; 42 Citadel Grove NW, Calgary, Alberta T3G 4G7 (CA). **HEIER, Michael Erskine** [CA/CA]; Site 9, Box 23, RR2, Cochrane, Alberta T4C 1A2 (CA). **GORODETSKY, Aleksandr** [CA/CA]; 440 Royal Oak Circle, NW, Calgary, Alberta T3G 4X8 (CA). **REESE, Stephanie** [US/US]; 114 Camelot Court, Cranberry Township, Pennsylvania 16066 (US). **HICKS, Kent Olis** [CA/CA]; 3 Evergreen Rise SW, Calgary, Alberta T2Y 3H6 (CA).

(74) Agent: **LENART, Robert P.**; Pietragallo Gordon Alfano Bosick & Raspanti, LLP, One Oxford Centre, 38th Floor, 301 Grant Street, Pittsburgh, Pennsylvania 15219 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR,

[Continued on next page]

(54) Title: PLASMA GASIFICATION REACTORS WITH MODIFIED CARBON BEDS AND REDUCED COKE REQUIREMENTS



(57) Abstract: A carbonaceous bed in a reactor includes carbon bearing material that is not coke and rather includes natural wood blocks or bricks formed of non-coke carbonaceous material in a binder along with, as options, other constituents such as catalysts and fluxing agents. The bed reduces the amount of coke required in processes such as for syngas production. Such non-coke units are applicable to an original carbonaceous bed in a reactor and also to replenishment of reacted carbon in the original bed. The bed may include ungasified carbon particulate matter separated from gaseous reaction products of a gasification reactor, either in non-coke bricks or otherwise applied, as may other carbonaceous material often regarded as waste such as spent potliner material from aluminum making and soot residue from a gasification reactor. Certain reactor structural modifications can also result in reduced consumption of carbon in a bed.



KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS,

SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- without international search report and to be republished upon receipt of that report (Rule 48.2(g))